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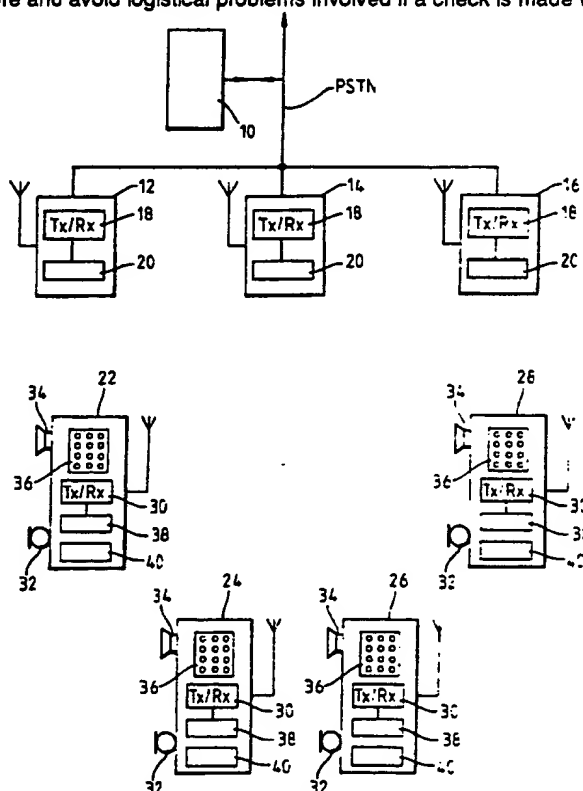
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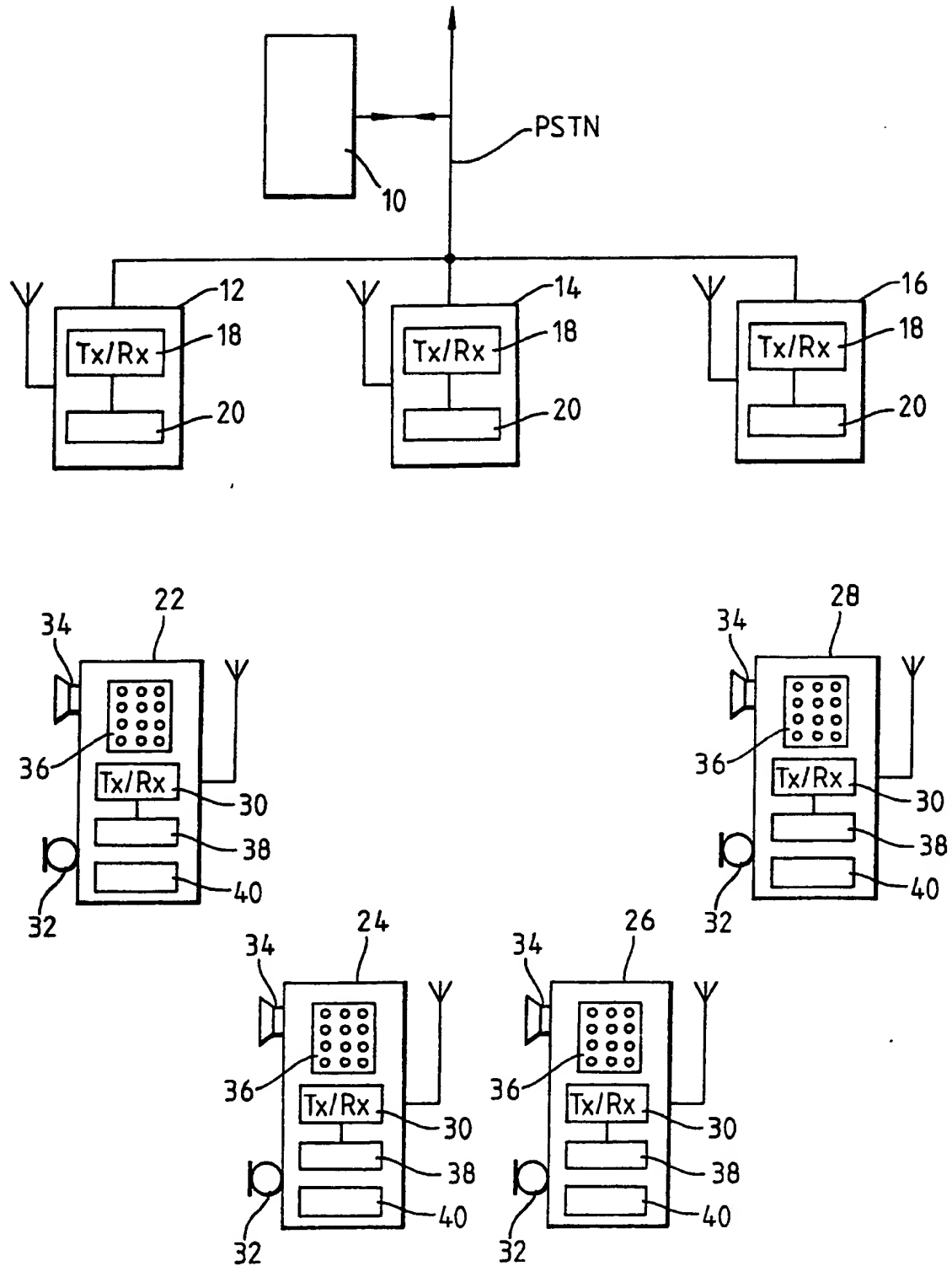
(54) A radiotelephone system

(57) A radiotelephone system comprises primary stations 12, 14, 16, consisting of telepoint equipments, and secondary stations 22, 24, 26, 28 which can roam within the operating area of the system. The status e.g. credit information, of a secondary station is stored in a memory of the secondary station. When making a call the status information is transmitted as part of the call procedure and compared with status information stored by the primary station. Such an arrangement is intended to simplify the call set-up procedure and avoid logistical problems involved if a check is made with a central data base by way of the PSTN.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy

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DESCRIPTION

A METHOD OF OPERATING A RADIOTELEPHONE SYSTEM

The present invention relates to a method of operating a radiotelephone system in which a primary station linked to a public switched telephone network (PSIN) communicates by way of a radio link with one of a plurality of secondary stations.

An example of one such system is a cordless telephone system in which a user with a handset (or a secondary station) communicates with a fixed base station (or a primary station) which is connected to the PSIN. The primary station is what is becoming known in the art as a telepoint, that is, it enables roaming secondary stations wishing to make outgoing calls to establish a radio link with a primary station which in turn effects a connection to the PSIN.

A problem which arises with radiotelephone systems is how to prevent secondary stations from making unauthorised calls, for example, because their account has not been paid and is overdue.

According to one aspect of the present invention there is provided a method of operating a radiotelephone system comprising a primary station and at least one secondary station, communication between the primary station and the or each secondary station being by way of a two-way radio link and communication between primary stations being by way of the PSIN, wherein status information relating to a secondary station is stored in the respective secondary station.

By the secondary station storing an indication of its status then when initiating a call, a status check can form part of the exchange of messages involved in the call procedure. Furthermore if the status needs to be changed then a status update can also form part of the status check.

In an embodiment of the present invention, status information relating to a plurality of secondary stations is stored by the primary station. Carrying out a status check locally, that is, between a primary and a secondary station, is regarded as more efficient than a system in which a status check

has to be made each time with a central data base by way of the PSIN.

5 If desired the current status of the or each secondary station may be stored in a central data base which downloads the current status information to the primary stations intermittently to thereby update the status information stored in the primary station. In the interests of economy only the status information concerning changes need be down-loaded by the central data base, for example only details of those secondary stations which are to
10 be blacklisted due to say non-payment of their bills, or alternatively are to be removed from a blacklist need be communicated. Alternatively the status information stored in the primary station may comprise a white list, that is, a list of secondary stations which are authorised to use the system.
15 Maintaining an up to date white list has an advantage that the status of disused secondary stations does not have to be transferred from the data base.

If desired a secondary station may verify its status by telephoning a special number. Such a facility is of particular
20 value if for example due to a flat battery or a battery exchange, the store has become erased. In response to such a status enquiry the primary and secondary stations can be given a status update.

In the event of a secondary station having been blacklisted
25 or alternatively not being on a white list, the primary station may alter the status of a secondary station by limiting the credit to a predetermined number of telephone charge units.

The status of a secondary station which has been blacklisted may be altered by electrically changing the status stored in
30 response to prepayment of a number of telephone charge units.

For the convenience of the user of a secondary station, its status and/or credit rating may be displayed on a display device such as a liquid crystal display panel.

35 Optionally billing could also be sent over the air interface and displayed.

According to another aspect of the present invention there is provided a radiotelephone system comprising a primary station connected to a PSTN and a plurality of secondary stations, wherein the primary station comprises a radio transceiver and control means, and wherein each secondary station comprises a radio transceiver for communicating with the transceiver of the primary station and storage means for storing its status.

If desired at least some of the secondary stations may each comprise means for providing an indication of its status.

In an embodiment of the present invention each primary station comprises a memory for storing the status of at least some of the secondary stations.

According to a further aspect of the present invention there is provided a transportable secondary station for use with the system in accordance with the another aspect of the present invention, the station comprising a transceiver for communicating with a primary station and storage means for storing its status.

The present invention will now be described, by way of example, with reference to the single figure of the accompanying drawing which figure is a diagram of a radiotelephone system.

The illustrated system comprises a central data base 10 connected by a PSTN to a plurality of geographically separated primary stations 12, 14 and 16, each of which may be regarded as a telepoint. Each primary station 12, 14 or 16 comprises a transceiver 18 and a memory device 20, such as an EEPROM or a RAM, for storing status information relating to secondary, transportable stations 22, 24, 26 and 28 which are free to roam over the entire area covered by the system. The secondary stations 22 to 28 communicate with one of the primary stations 12 to 16 by way of a radio link and for that purpose each includes a transceiver 30. Additionally each secondary station includes a microphone 32, an earpiece 34, a keypad 36, a non-volatile memory 38 for storing details of its status, for example it is in credit with the system and therefore authorised to make calls or its credit has been exhausted and it is blacklisted due to not having

settled its outstanding bill, and a LCD panel 40 which includes an area for displaying status.

Communication between the primary and secondary stations is done digitally on a time division multiplex basis sometimes referred to as a ping-pong method. In such a system segments of speech are digitised, compressed with respect to time and transmitted in a dedicated time slot. The digitised code word structure will typically comprise synchronisation data, signalling data and digitised speech. It is envisaged that the signalling data can include an indication of status, for example a zero if the status is normal (or authorised) and a "1" if the secondary station is blacklisted. At the receiver, the signal segment is expanded and decoded.

In operation of the system the central data base 10 stores the status information of all the secondary stations, which information is updated as and when required. The primary stations 12, 14, 16 store in their memory devices 20 the status information of either all the secondary stations in the service area or the secondary stations registered in a region of the overall service area. Status information as stored in the primary stations is updated intermittently as a matter of routine by the central data base 10 downloading the current status information. The downloading of the information can be simplified by communicating only the information which has changed, for example the placing of a secondary station on, or the removal of a secondary station from, a blacklist. Conversely the information may relate to those secondary stations which are authorised (or white listed).

When a secondary station is in range of a primary station and wishes to initiate a call, then as part of the call procedure a status check is made. During this phase if the status of the secondary station has changed then this can be communicated to the secondary station and the data stored in its memory 38 is updated.

In the event of a secondary station appearing on a blacklist

or the primary station being unable to ascertain the status of the secondary station, then the primary station has the ability to authorise the crediting of a number of telephone charge units in the memory of the secondary unit thereby giving it, at least temporarily, a normal operating status. In the case of doubt the primary station can make a specific status enquiry to the central data base 10.

If a secondary station wishes to check its status, for example because it is a newly supplied station or its memory has become erased due to disconnection of, or failure of, its power supply, then the secondary station can make its own status check enquiry by telephoning a specified number. The current status as stored in the central data base 10 can then be downloaded to the primary station and in due course to the secondary station.

Another desirable feature is to enable a user to change the status of a blacklisted secondary station by the prepayment of a number of telephone charge units. This may be done by inserting the secondary station into a device for altering the data stored in the memory 38. Alternatively the secondary station may include means for receiving credits by way of prepaid telephone cards, bank credit cards and the so-called smart cards. The primary station on determining that telephone charge units have been prepaid will then deduct charge units from the number stored at the beginning of a call and optionally during a call if its duration exceeds a predetermined minimum.

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design, manufacture and use of radiotelephone systems and component parts thereof and which may be used instead of or in addition to features already described herein. Although claims have been formulated in this application to particular combinations of features, it should be understood that the scope of the disclosure of the present application also includes any novel feature or any novel combination of features disclosed

herein either explicitly or implicitly or any generalisation thereof, whether or not it relates to the same invention as presently claimed in any claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The applicants hereby give notice that new claims may be formulated to such features and /or combinations of such features during the prosecution of the present application or of any further application derived therefrom.

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CLAIM(S)

1. A method of operating a radiotelephone system comprising a primary station and at least one secondary station, communication between the primary station and the or each
5 secondary station being by way of a two-way radio link and communication between primary stations being by way of the PSTN, wherein status information relating to a secondary station is stored by the respective secondary station.
2. A method as claimed in Claim 1, wherein status
10 information relating to a plurality of secondary stations is stored by the primary station.
3. A method as claimed in Claim 1 or 2, wherein the current status of the or each secondary station is stored in a central data base which information is used to update the status
15 information stored in the secondary station.
4. A method as claimed in Claim 3, wherein the status of a secondary station is updated during the call procedure with a primary station.
5. A method as claimed in Claim 3 or 4, wherein the status
20 of a secondary station is checked during a call.
6. A method as claimed in Claim 3, 4 or 5, wherein the current status of a secondary station can be updated by the secondary station telephoning a special number.
7. A method as claimed in any one of Claims 1 to 6, wherein
25 the status of a secondary station can be changed temporarily by a user placing the secondary station in credit.
8. A method as claimed in any one of Claims 1 to 6, wherein the status of a secondary station can be changed temporarily by the primary station giving the secondary station limited credit.
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9. A method as claimed in any one of Claims 1 to 8, wherein the status of the secondary station is indicated by a display device.
10. A method as claimed in any one of Claims 1 to 9, wherein
35 billing information is transmitted to the secondary station.
11. A radiotelephone system comprising a primary station

connected to a PSIN and a plurality of secondary stations,
wherein the primary station comprises a radio transceiver and
control means, and wherein each secondary station comprises a
radio transceiver for communicating with the transceiver of the
primary station and storage means for storing its status.

12. A system as claimed in Claim 11, wherein at least some
of the secondary stations each comprise means for providing an
indication of its status.

13. A system as claimed in Claim 11 or 12, wherein each
primary station comprises a memory for storing the status of at
least some of the secondary stations.

14. A system as claimed in Claim 13, further comprising a
data base coupled to the PSIN, said data base having storage
means for storing the status of the secondary stations in the
system, means for updating the storage means and means for
communicating the current status of the secondary stations to the
primary stations for updating the status details stored in their
memories.

15. A system as claimed in any one of Claims 11 to 14,
further comprising means for altering the status of a secondary
station.

16. A transportable secondary station for use in the system
as claimed in Claim 11, comprising a transceiver for
communicating with a primary station and storage means for
storing its status.

17. A secondary station as claimed in Claim 16, further
comprising means for providing an indication of its status.

18. A secondary station as claimed in Claim 16 or 17,
further comprising means for altering its status.

19. A method of operating a radiotelephone system
substantially as hereinbefore described with reference to the
accompanying drawing.

20. A radiotelephone system constructed and arranged to
operate substantially as hereinbefore described with reference to
and as shown in the accompanying drawings.

21. A transportable secondary station constructed and arranged to operate substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

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